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Full Length Research

Assessment of People's Perception and Willingness to Pay for Environmental Services of Trees in Wukari, Taraba State

[1]Zaku S.S., [1]Maiguru A.A., and [1]Egoh E.D.

[1]Department of Forestry and Wild life Management, Federal University Wukari Taraba State, Nigeria.

*Corresponding Author's: E-mail Address ✉: sszaku@yahoo.com; Phone no ☎: (+234), 08032238713

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Forest ecosystems provide myriad of goods and services with trees being the dominant supplier. Trees provide environmental services such as control of soil erosion, reducing noise level, improve air quality, regulating regional rainfall, recreation and tourism as well as carbon sequestration. These environmental services provided by trees are important but are not quantifiable in monetary terms. They are not traded in the market place and so do not have price or commercial value. Despite the provision of all these environmental services by trees in the study area, these services are not known, documented or paid for, in the study area. When people pay for services provided by the trees, they attach value to the trees and that will prevent its Illegal destruction. Therefore, "Assessment of people's perception of environmental services of trees and their willingness to Pay for such services" were investigated.

Key words: Environmental services, Trees, willingness to pay, monetary valuation and perception.

INTRODUCTION

Trees are renewable natural resources that are harvested for both timber and non-timber products Trees provide myriad of goods and services such as soil erosion control, reducing noise level, improving air quality, line street and make cities attractive, regulate rainfall, tourism and recreation, carbon sequestration and mitigation of global warming. Also, trees provide shade and enhances water shed management or shelter belt in the study area. But these services do not have monetary values and are not priced in the markets. Frank and van Beukering (1997), stated that economic valuation methods offer a more comprehensive assessment of the many goods and services provided by ecosystems and hence may contribute to more informed decision-making(John, 2011; Action biodiversity, 2014), argue that the object of monetary valuation is not the environment itself, but rather the peoples' preferences for changes in the state of their environment, and their preferences for changes in the level of risk to their lives. They opined that importance is measured by preference which in turn is measured by the summation of many individuals' willingness to pay for the environmental services of the trees. In essence the true value of the trees must include not only its productive value as a commodity timber, but also its non-timber use values; which include the indirect use of the trees' environmental

service functions and relevant existence values (Ajewole, 2000). Popoola, (1995), observed that appropriate pricing and or valuing of trees will take adequate care of the basic conservation themes which include resources scarcity, ecological balance, quality of life and wasteful and destructive use of the trees and this will contribute to more informed decision-making that will help to conserve and sustain the tree species. Economists have developed several specialized techniques to address the difficulties inherent in estimating demand and thus consumer surplus measures for un-priced or non-market services also called environmental services of trees. The following techniques are used to assign monetary values to services provided by trees. They include travel cost, hedonic approach, Delphi approach, travel cost and contingent valuation. The travel cost method is commonly use to estimate the value of non-market goods or services and relies on travel expenditures incurred to visit a site (Bolund and Hunmmar, 1999). This approach is applied to recreational and other site-specific activities or resources that necessitate travel costs to experience the goods or services associated with the site.

The hedonic approach uses the price of a market good or services. (Agbaje, 2011). For instance, in the case of air quality the hedonic approach would collect information on home sales (prices) and the environmental amenities available at locations where homes were sold. It would employ statistical techniques to separate the influence of air quality from other factors that affect housing prices and then estimate the portion of the sale prices of the homes that is attributable to air quality. This observed willingness to pay for air quality as an addition to the price of a home is used to calculate a demand function for air quality and thus the consumer surplus associated with different levels of air quality**.**

The travel cost and hedonic methods use observations of actual behavior of traveling or purchasing at home to estimate demand and consumer surplus. This technique relies on the ability to link market behavior to a non-market ecosystem service. This is not possible for passive use values. An alternative valuation method, called contingent valuation, was developed to estimate passive use values. Instead of relying on observed behavior, the contingent valuation method asks people what they would be willing to pay for an ecosystem good or service. The approach uses a questionnaire or interview to present respondents with a market like situation where they can express a monetary value for a carefully described non - market good or environmental service. Public awareness and willingness to pay for environmental services of trees are considered a potential instrument to mitigate environment and development challenges faced in tropical countries.

If economic values for conservation, and the public's marginal willingness to pay for conservation, are not estimated in this manner, many of the major benefits of ecosystems will continue to be excluded in benefit-cost computations. The likely outcome of such an omission is too little protection for ecosystems and as a consequence the majority of services that people directly and indirectly consume are under supplied.

SAMPLING SIZE AND SAMPLING PROCEDURE

A multi-stage sampling technique with three stages was adopted for this study. The first stage involves the identification of baseline population of the respondents drawn from relevant stakeholders. The second stage involved selection of 30% of respondents from the baseline population for the study. The third stage involved the administration and the retrieval of questionnaires administered to the respondents. Firstly, a total of 624 respondents were identified during the baseline survey in the order of; Farmers, 450; Civil servants, 101; Saw millers and Timber contractors, 25; Hunters, 19; Fishermen, 20; Forestry staff, 9: At 30% sampling intensity, a total of 188 respondents were selected for the study and 188 semi- structure questionnaires were administered to the respondents as follows; Famers,135; Civil servant, 30; Saw millers and Timber contractors, 8; Hunters, 6; Fishermen, 6; Forestry staff, 3. However only 175 questionnaires were retrieved (Table 1). Environmental services of trees and people's willingness to pay for such services were evaluated as indices for the study and Data generated were analyzed using descriptive statistical tools (Diaw et al., 2002).

B = Baseline population of the respondents in the study area.

N = 30% of the baseline population of the respondents in the study area and represent the target population for the study. It is the total number of respondents that were given questionnaires for the study.

X = Number of questionnaires retrieved from 30% of

Table 1. Sample size and Sampling Technique.

S/N	Variables	B	N (30)	X	Percentage (%)
1	Farmers	450	135	122	69.8
2	Civil Servants	101	30	30	17.1
3	Saw miller/Timber contractor	25	8	8	4.6
4	Hunters	19	6	6	3.4
5	Fishermen	20	6	6	3.4
6	Forestry Staff	9	3	3	1.7
7	**Total**	**624**	**188**	**175**	**100**

Source: Field Survey, (2019**)**

the baseline population of the respondents in the study area.

RESULT AND DISCUSSION

Socio - Economic Characteristics of the Respondents

The result on sex of the respondents indicated that 120 (68.6%) of the respondents are males while 55 (31.4%) of the respondents are females. This means that, majority of the respondents are males. Similarly, the result on age of the respondents indicated 15 (8.6%) of the respondents are between ages 1-30 years, 125 (71.4%) are aged 31-60 years while 35 (20%) are above 60 years. Also, the result on marital status showed that 25 (14.3%) of the respondents are single while 150 (85.7%) are married. This means that majority of the respondents are married in the study area. The result on the educational status indicated that 100 (57.1%) of the respondents are learned while 75 (42.9%) are not learned. The result on household size indicated that 25 (14.3%) had no children (0), 30 (17.1%) had 1-3, 95 (54.3%) had 4-6 while 25 (14.3%) had 6 children and above. The high number of household sizes recorded, may be due to the polygamous nature of the respondents in the study area (Table 2).

The findings of the study implied that, the respondents are well chosen and structured and are aware of the environmental services provided by trees in the study area. Irrespective of their sex, age, marital status, educational status and household size. This corroborates Ajewole and Popoola (2001), that, trees provide environmental services that benefit human beings irrespective of their socio - economic characteristics.

Environmental Services of Trees in the Study Area

The result on whether or not trees provide environmental services indicated that all the respondents agreed that trees do provide services (i.e. 175 respondents which is 100%).

Similarly, the result on environmental services provided by trees indicated 25 (14.3%) of the respondents reported that, trees control soil erosion in the study area, 15 (8.6%) each of the respondents indicated that trees provide services such as reducing noise level, improve air quality, line street and make cities attractive, 20 (11.4%) of the respondents reported that trees regulate rainfall in the study area. while 21 (12%) of the respondents indicated that trees provide service of recreation and tourism. Also 24 (13.7%) of the respondents reported that, trees provide service of carbon sequestration and mitigation of global warming. while 18 (10.3%) of the respondents indicated that trees provide shade in the study area. However, 22 (12.5%) of the respondents reported that, trees enhance water shed management or shelter belt in the study area (Table 3). The above implies that, trees provide environmental services in the study area. The findings of the study indicated that, trees provided nine (9) environmental services and they include: control of soil erosion, reducing noise level, improving air quality, regulating rainfall, recreation and tourism, carbon sequestration and mitigation of global warming, provision of shade, line street and make them attractive and enhancement of water-shed management or shelter belt.

The study corroborates Steve, (2015) that trees

Table 2. Socio-Economic Characteristics of the respondents.

Variables	Respondents	Percentages
Sex:		
Male	120	68.6
Female	55	31.4
Total	175	100
Age:		
1-30 years	15	8.6
31-60 Years	125	71.4
>60 years	35	20
Total	175	100
Marital Status:		
Single	25	14.3
Married	150	85.7
Total	175	100
Educational Status:		
Learned	100	57.1
Not learned	75	42.9
Total	175	100
Household Size:		
0	25	14.3
1-3	30	17.1
4-6	95	54.3
>6	25	14.3
Total	175	100

Source: Field Survey, (2019).

fight soil erosion, conserve rain water and reduce water run-off. The study also agrees with the submission of Barbara (2010) that, trees reduces noise level. Furthermore, the study is in tandem with the findings of Savatree (2016) and Dwye et al (1991) that, trees improves air quality. Similarly, the study agrees with the findings of TEEB, (2010) that, trees regulate rainfall. The study also corroborates Nowalk and Dwyer, (2007); Patosaari, (2007) that, trees provides recreation and tourism as well as carbon sequestration. The study also agrees with the submission of Ajewole and Popoola (2001) that, trees provides shade and line up streets where ever there are found.

Assigning of Monetary Values to Environmental Services of Trees in The Study Area

The result on assigning monetary values to environmental services of trees in the study area indicated that majority of the respondents 150 (85.7%) wanted it done while 25 (14.3%) do not want it done (Table 4).

The findings of the study implied that, majority of the respondents want monetary values to be assigned to each of the environmental services provided by trees. This corroborates the findings of Ajewole and Popoola (2001), that people want monetary values to be assigned to environmental services of trees in Ibadan metropolis.

Willingness to Pay for Environmental Services of Trees in the Study Area

The result on willingness to pay (WTP) for environmental services of trees in the study area indicated that, 85(48.6%) are willing to pay five hundred naira (N500); 20(11.4%), N1,000; 15(8.6%), N2,000; 10(5.7%), N3,000; 8(4.6%), N4,000; 7(4%), N5,000 and 5(2.8%) were ready to pay above six

Table 3. Environmental Services of trees in the study area.

S/N	Variables	Respondents	Percentages
	Does trees provide environmental services in the study area?		
	YES	175	100
	NO	0	0
	Total	175	100
	Environmental services provided by trees in the study area.		
i.	Control of soil erosion	25	14.3
ii.	Reducing noise level	15	8.6
iii.	Improving air quality	15	8.6
iv.	Regulating rainfall	20	11.4
v.	Recreation and tourism	21	12
vi.	Carbon sequestration and mitigation of global warming	24	13.7
vii.	Provision of shade	18	10.3
viii.	Trees line street and make cities attractive	15	8.6
ix.	Enhancement of water shed management or shelter belt.	22	12.5
	Total	175	100

Source: Field survey, (2019).

Table 4. Assigning of monetary values to environmental services of trees in the study area.

Variables	Respondents	Percentages (%)
Would you want monetary values to be assigned to environmental services provided by trees in the study area?		
YES	150	85.7
NO	25	14.3
Total	175	100

Source: Field survey, (2019).

thousand naira respectively (Table 4). The fact that, only 25(14.3%) were un-willing to pay while 75(85.7%) were willing to pay various amounts for the services provided by the trees implies that, the respondents in the study area are willing to pay for services provided by trees if monetary values are assigned to the environmental services of trees in the study area. The findings of the study corroborate the submission by Ajewole and Popoola (2001) that, majority of the inhabitants of Ibadan metropolis were willing to pay for the environmental services of trees with an un-willing few.

Table 5. Willingness to Pay for Environmental Services of Trees in the Study Area.

Variables	Respondents	Percentages (%)
How much are you ready to pay for the environmental services of trees that you are enjoying?		
0	25	14.3
500	85	48.6
1,000	20	11.4
2,000	15	8.6
3,000	10	5.7
4,000	8	4.6
5,000	7	4
6,000 & Above	5	2.8
Total	**175**	**100**

Source: Field Survey, (2019).

CONCLUSION

The followings are the major conclusions of the study;

- Trees provide nine (9) environmental services in the study area
- Assigning of monetary values to environmental services of trees was agreed by the majority of the respondents in the study area.
- Willingness to pay for environmental services of trees was also agreed by majority of the respondents in the study area.

RECOMMENDATIONS

Based on the major findings of the study, the followings are recommended;

- There is need for more awareness on the need to assign monetary values to environmental services of trees. This is because, people need to know that assigning monetary values will give cost and price for such services and this can help to sustain the tree planting campaign and even paid for the labour involved.
- There is also need to mobilized the un-willing to pay respondents on the need to pay for such services as this can prevents wanton destruction of the trees, because when people know the importance of trees and are made to pay for services provide by the trees, they will attached a lot of importance to it and this will reduce the illegal destruction of the trees in the study area.
- There is also the need to quantify the environmental services of trees in monetary terms so as to place value on such services.
- There is the need for trees planting campaign. Everyone should be made to plant a tree. (one man one tree). That is for every single tree fell another one should be planted in tree

Standing area.

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